AMENDMENTS TO THE CLAIMS

1. (Previously Presented) An apparatus for encoding k consecutive input bits indicating a TFCI (Transport Format Combination Indicator) of into a sequence of m symbols in an NB-TDD (Narrowband-Time Division Duplex) mobile communication system, comprising:

an encoder for encoding the k input bits into a sequence of at least 2^n symbols where $2^n>m$, using an extended Reed-Muller code; and

a puncturer for performing puncturing on the sequence of 2^n symbols from the encoder so as to output a sequence of m symbols.

2. (Previously Presented) The apparatus as claimed in claim 1, wherein the encoder comprises:

a 1-bit generator for generating a sequence of same symbols;

a basis orthogonal sequence generator for generating a plurality of basis orthogonal sequences;

B1

a basis mask sequence generator for generating a plurality of basis mask sequences; and

an operator for receiving the TFCI including a first information part indicating conversion to a biorthogonal sequence, a second information part indicating conversion to an orthogonal sequence and a third information part indicating conversion to a mask sequence, and generating the sequence of 2^n symbols by combining an orthogonal sequence selected from the basis orthogonal sequences by the second information part, a biorthogonal sequence constructed by a combination of the selected orthogonal sequence and the same symbols selected by the first information part, and a mask sequence selected by the third information part.

3. (Original) The apparatus as claimed in claim 1, wherein the encoder creates a (64,10) code.

4. (Previously Presented) The apparatus as claimed in claim 2, wherein the basis orthogonal sequences include a 1^{st} Walsh code, a 2^{nd} Walsh code, a 4^{th} Walsh code, an 8^{th} Walsh

code, a 16th Walsh code and a 32nd Walsh code, selected from 64 orthogonal sequences of length 64.

5. (Previously Presented) The apparatus as claimed in claim 2, wherein the basis mask sequences include a 1st mask sequence of 00110101011011111010001100000110111101100101001110011111111000101, a 2nd mask sequence of 01000111110100011110110101111011011110110001001011010000110111000, and a 4th mask sequence of 00011000111001111101010011010100101111011011110101110001100011110.

6. (Previously Presented) The apparatus as claimed in claim 2, wherein the operator comprises:

a first multiplier for multiplying the same symbols by the first information part;

a plurality of second multipliers for multiplying the basis orthogonal sequences by TFCI bits constituting the second information part;

a plurality of third multipliers for multiplying the basis mask sequences by TFCI bits constituting the third information part; and

an adder for generating the sequence of 2^n symbols by adding outputs of the first to third multipliers.

7. (Original) The apparatus as claimed in claim 2, wherein the puncturer performs puncturing according to any one of puncturing patterns given below:

{0, 4, 8,13,16,20,27,31,34,38,41,44,50,54,57,61}

{0, 4, 8,13,16,21,25,28,32,37,43,44,49,52,56,62}

{0, 4, 8,13,16,21,25,31,32,37,43,44,49,52,56,61}

{0, 4, 8,13,18,21,25,30,35,36,40,46,50,53,57,62}

{0, 4, 8,13,18,21,25,30,35,37,40,47,50,53,57,62}

{0, 4, 8,13,19,22,27,30,33,36,41,44,49,55,58,61}

{0, 4, 8,13,19,22,27,30,33,36,41,44,50,52,56,63}

{0, 4, 8,13,19,22,27,30,33,36,41,44,50,52,58,61}

{0, 4, 8,13,16,20,27,31,34,38,41,44,50,54,57,61}

8. (Previously Presented) An apparatus for encoding k consecutive input bits indicating a TFCI into a sequence of m symbols in an NB-TDD mobile communication system, comprising:

an orthogonal sequence generator for creating a plurality of biorthogonal sequences having a length of at least 2^n where $2^n>m$, and outputting a biorthogonal sequence selected from the biorthogonal sequences by first information bits of the TFCI;

a mask sequence generator for creating a plurality of mask sequences, and outputting a mask sequence selected from the mask sequences by second information bits of the TFCI;

an adder for adding a biorthogonal sequence from the orthogonal sequence generator and a mask sequence from the mask sequence generator; and

a puncturer for performing puncturing on the sequence of 2^n symbols from the adder so as to output the sequence of m symbols.

9. (Original) The apparatus as claimed in claim 8, wherein the puncturer performs puncturing according to one of following puncturing patterns:

{0, 4, 8,13,16,20,27,31,34,38,41,44,50,54,57,61}

{0, 4, 8,13,16,21,25,28,32,37,43,44,49,52,56,62}

{0, 4, 8,13,16,21,25,31,32,37,43,44,49,52,56,61}

{0, 4, 8,13,18,21,25,30,35,36,40,46,50,53,57,62}

{0, 4, 8,13,18,21,25,30,35,37,40,47,50,53,57,62}

{0, 4, 8,13,19,22,27,30,33,36,41,44,49,55,58,61}

{0, 4, 8,13,19,22,27,30,33,36,41,44,50,52,56,63}

{0, 4, 8,13,19,22,27,30,33,36,41,44,50,52,58,61}

{0, 4, 8,13,16,20,27,31,34,38,41,44,50,54,57,61}

Claims 10 to 13 (Cancelled)

14. (Previously Presented) A method for encoding k consecutive input bits indicating a TFCI of each into a sequence of m symbols in an NB-TDD mobile communication system, comprising:

encoding the k input bits into a sequence of at least 2^n symbols where $2^n>m$, using an extended Reed-Muller code; and

performing puncturing on the sequence of 2^n symbols so as to output a sequence of m symbols.

15. (Previously Presented) The method as claimed in claim 14, wherein the encoding step comprises the steps of:

generating a sequence of same symbols;

generating a plurality of basis orthogonal sequences;

generating a plurality of basis mask sequences; and

receiving the TFCI including a first information part indicating conversion to a biorthogonal sequence, a second information part indicating conversion to an orthogonal sequence and a third information part indicating conversion to a mask sequence, and generating the sequence of 2^n symbols by combining an orthogonal sequence selected from the basis orthogonal sequences by the second information part, a biorthogonal sequence constructed by a combination of the selected orthogonal sequence and the same symbols selected by the first information part, and a mask sequence selected by the third information part.

16. (Previously Presented) The method as claimed in claim 15, wherein the basis orthogonal sequences include a 1^{st} Walsh code, a 2^{nd} Walsh code, a 4^{th} Walsh code, an 8^{th} Walsh code, a 16^{th} Walsh code and a 32^{nd} Walsh code, selected from 64 orthogonal sequences of length 64.

17. (Previously Presented) The method as claimed in claim 15, wherein the basis mask sequences include a 1^{st} mask sequence of 00110101011011111010001100000110111101100101001110011111111000101, a 2^{nd} mask sequence of 01000111110100011110110101111011011110110001001011010001101110000, and

a 4th mask sequence of

00011000111001111101010011010100101111011011110101110001100011110.

18. (Original) The method as claimed in claim 14, wherein the puncturing is performed according to any one of puncturing patterns given below:

{0, 4, 8,13,16,20,27,31,34,38,41,44,50,54,57,61}

{0, 4, 8,13,16,21,25,28,32,37,43,44,49,52,56,62}

{0, 4, 8,13,16,21,25,31,32,37,43,44,49,52,56,61}

{0, 4, 8,13,18,21,25,30,35,36,40,46,50,53,57,62}

{0, 4, 8,13,18,21,25,30,35,37,40,47,50,53,57,62}

{0, 4, 8,13,19,22,27,30,33,36,41,44,49,55,58,61}

{0, 4, 8,13,19,22,27,30,33,36,41,44,50,52,56,63}

{0, 4, 8,13,19,22,27,30,33,36,41,44,50,52,58,61}

{0, 4, 8,13,16,20,27,31,34,38,41,44,50,54,57,61}

B1

19. (Previously Presented) A method for encoding k consecutive input bits indicating a TFCI of each of successively transmitted frames into a sequence of m symbols in an NB-TDD mobile communication system, comprising:

creating a plurality of biorthogonal sequences having a length of at least 2^n where $2^n>m$, and outputting a biorthogonal sequence selected from the biorthogonal sequences by first information bits of the TFCI;

creating a plurality of mask sequences, and outputting a mask sequence selected from the mask sequences by second information bits of the TFCI;

adding the selected biorthogonal sequence and the mask sequence; and

performing puncturing on the sequence of 2^n symbols so as to output the sequence of m symbols.

20. (Original) The method as claimed in claim 19, wherein the puncturing is performed according to one of following puncturing patterns:

{0, 4, 8,13,16,20,27,31,34,38,41,44,50,54,57,61}

{0, 4, 8,13,16,21,25,28,32,37,43,44,49,52,56,62}

{0, 4, 8,13,16,21,25,31,32,37,43,44,49,52,56,61}

{0, 4, 8,13,18,21,25,30,35,36,40,46,50,53,57,62}

{0, 4, 8,13,18,21,25,30,35,37,40,47,50,53,57,62}

{0, 4, 8,13,19,22,27,30,33,36,41,44,49,55,58,61}

{0, 4, 8,13,19,22,27,30,33,36,41,44,50,52,56,63}

{0, 4, 8,13,19,22,27,30,33,36,41,44,50,52,58,61}

{0, 4, 8,13,16,20,27,31,34,38,41,44,50,54,57,61}

Claims 21 to 24 (Cancelled)

25. (Previously Presented) An apparatus for encoding 10 consecutive input bits indicating a TFCI of each 48 symbols in an NB-TDD mobile communication system, comprising:

a (64,10) second order Reed Muller code generator for generating 64 coded symbols by using length 64 Walsh codes and length 64 masks in response to the input bits; and

a puncturer for puncturing 16 symbols out of the 64 coded symbols wherein puncturing positions of the 16 symbols are as follows;

{0, 4, 8,13,16,20,27,31,34,38,41,44,50,54,57,61}.

Claims 26 to 28 (Cancelled)

29. (Previously Presented) A method for encoding 10 consecutive input bits indicating a TFCI of each 48 symbols in an NB-TDD mobile communication system, comprising the step of:

second order Reed Muller coding for generating 64 coded symbols by using length 64 Walsh codes and length 64 masks in response to the input bits; and

generating 48 symbols by puncturing 16 symbols out of the 64 coded symbols wherein puncturing positions of the 16 symbols are as follows;

{0, 4, 8,13,16,20,27,31,34,38,41,44,50,54,57,61}.

30. (Previously Presented) The method as claimed in claim 29, wherein the Walsh codes include a 1st Walsh code, a 2nd Walsh code, a 4th Walsh code, an 8th Walsh code, a 16th Walsh code and a 32nd Walsh code, selected from 64 Walsh orthogonal sequences of length 64.

31. (Currently Amended) The method ~~apparatus~~ as claimed in claim 29 ~~26~~, wherein the masks include a 1st mask sequence of 0011010101101111101000110000011011110110010100111001111111000101, a 2nd mask sequence of 0100011111010001111011010111101101111011000100101101000110111000, and a 3rd mask sequence of 0001100011100111110101001101010010111101101111010111000110001110, wherein said ~~basis~~ mask sequences are selected from mask sequences generated ~~made~~ by using a Kasami sequence according to a linear independent property.